WHAT IS CLAIMED IS:

1   1.   For use in a fixed-size packet switch, a switch fabric

2   comprising:

3   N input buffers capable of receiving incoming fixed-size

4   data packets at a first data rate and outputting said fixed-size

5   data packets at a second data rate equal to at least twice said

6   first data rate;

7   N output buffers capable of receiving fixed-size data

8   packets at said second data rate and outputting said fixed-size

9   data packets at said first data rate; and

10   a bufferless, non-blocking interconnecting network

11   capable of receiving from said N input buffers said fixed-size data

12   packets at said second data rate and transferring said fixed-size

13   data packets to said N output buffers at said second data rate.

1   2.   The switch fabric as set forth in Claim 1 wherein said

2   bufferless, non-blocking interconnecting network comprises a

3   bufferless crossbar.

1   3.   The switch fabric as set forth in Claim 1 wherein each of

2   said N input buffers is at least twice the size of each of said N

3   output buffers.

1   4.   A method of operating a switch fabric in a fixed-size

2   packet switch, the method comprising the steps of:

3   storing incoming fixed-size data packets in N input

4   buffers at a first data rate;

5   outputting the fixed-size data packets from the N input

6   buffers at a second data rate equal to at least twice the first

7   data rate;

8   transferring the fixed-size data packets output by the N

9   input buffers at the second data rate through a bufferless, non-

10   blocking interconnecting network to N output buffers;

11   storing the fixed-size data packets transferred through

12   the bufferless, non-blocking interconnecting network in the N

13   output buffers at the second data rate; and

14   outputting the fixed-size data packets from the n output

15   buffers at the first data rate.

1   5.   The method as set forth in Claim 4 wherein the

2   bufferless, non-blocking interconnecting network comprises a

3   bufferless crossbar.

1   6.   The method as set forth in Claim 5 wherein each of the N

2   input buffers is at least twice the size of each of the N output

3   buffers.

1   7.   A fixed-size data packet switch comprising:

2   N input ports capable of receiving incoming fixed-size

3   data packets at a first data rate and outputting said fixed-size

4   data packets at said first data rate;

5   N output ports capable of receiving fixed-size data

6   packets at said first data rate and outputting said fixed-size data

7   packets at said first data rate; and

8   a switch fabric interconnecting said N input ports and

9   said N output ports comprising:

10   N input buffers capable of receiving incoming fixed-

11   size data packets at said first data rate and outputting said

12   fixed-size data packets at a second data rate equal to at

13   least twice said first data rate;

14   N output buffers capable of receiving fixed-size

15   data packets at said second data rate and outputting said

16   fixed-size data packets at said first data rate; and

17   a bufferless, non-blocking interconnecting network

18   capable of receiving from said N input buffers said fixed-size

19   data packets at said second data rate and transferring said

20   fixed-size data packets to said N output buffers at said

21   second data rate.

1   8.   The fixed-size data packet switch as set forth in Claim 7

2   wherein said bufferless, non-blocking interconnecting network

3   comprises a bufferless crossbar.

1   9.   The fixed-size data packet switch as set forth in Claim 7

2   wherein each of said N input buffers is at least twice the size of

3   each of said N output buffers.

1   10. The fixed-size data packet switch as set forth in Claim 7

2   further comprising a scheduling controller capable of scheduling

3   transfer of said fixed-size data packets from said N input ports to

4   said switch fabric.

1   11. The fixed-size data packet switch as set forth in

2   Claim 10 wherein said scheduling controller is capable of

3   scheduling transfer of said fixed-size data packets from said N

4   output ports to an external device.

1   12. The fixed-size data packet switch as set forth in

2 Claim 10 wherein said scheduling controller is capable of

3 scheduling transfer of said fixed-size data packets from said N

4 input buffers to said bufferless, non-blocking interconnecting

5 network.

1   13. The fixed-size data packet switch as set forth in

2 Claim 12 wherein said scheduling controller is capable of

3 scheduling transfer of said fixed-size data packets from said N

4 output buffers to said N output ports.

1   14. A communication network capable of transferring data in

2   fixed-size packets between a plurality of end-user devices, said

3   communication network comprising:

4   a plurality of fixed-size data packet switches, at least

5   one of said fixed-size data packet switches comprising:

6   N input ports capable of receiving incoming fixed-

7   size data packets at a first data rate and outputting said

8   fixed-size data packets at said first data rate;

9   N output ports capable of receiving fixed-size data

10   packets at said first data rate and outputting said fixed-size

11   data packets at said first data rate; and

12   a switch fabric interconnecting said N input ports

13   and said N output ports comprising:

14   N input buffers capable of receiving incoming fixed-

15   size data packets at said first data rate and outputting said

16   fixed-size data packets at a second data rate equal to at

17   least twice said first data rate;

18   N output buffers capable of receiving fixed-size

19   data packets at said second data rate and outputting said

20   fixed-size data packets at said first data rate; and

21   a bufferless, non-blocking interconnecting network

22   capable of receiving from said N input buffers said fixed-size

- 25 -

23   data packets at said second data rate and transferring said

24   fixed-size data packets to said N output buffers at said

25   second data rate.

1   15. The communication network as set forth in Claim 14

2   wherein said bufferless, non-blocking interconnecting network

3   comprises a bufferless crossbar.

1   16. The communication network as set forth in Claim 14

2   wherein each of said N input buffers is at least twice the size of

3   each of said N output buffers.

1   17. The communication network as set forth in Claim 14

2   further comprising a scheduling controller capable of scheduling

3   transfer of said fixed-size data packets from said N input ports to

4   said switch fabric.

1   18. The communication network as set forth in Claim 17

2   wherein said scheduling controller is capable of scheduling

3   transfer of said fixed-size data packets from said N output ports

4   to an external device.

1   19. The communication network as set forth in Claim 17

2 wherein said scheduling controller is capable of scheduling

3 transfer of said fixed-size data packets from said N input buffers

4 to said bufferless, non-blocking interconnecting network.

1   20. The communication network as set forth in Claim 19

2 wherein said scheduling controller is capable of scheduling

3 transfer of said fixed-size data packets from said N output buffers

4 to said N output ports.